

## TUNISIA

*By Bob Foster*

*Exploration Consultants Ltd, Henley-on-Thames, UK*

Tunisia is the smallest of the north African 'Maghreb' countries and supports a population of only 9.4 million, with all but a small nomadic population confined to the cities. The executive President and National Assembly are elected by universal adult suffrage for five-year periods. Next elections for President and National Assembly will be in 2004. The country is bordered by Algeria to the west and Libya to the east.

Oil and gas are key factors in the country's economy, which has seen significant growth in industrial GDP in recent years. The estimated GDP real growth rate for 2003 was 6% and *per capita* GDP in the same period is estimated at US\$6,900. Industrial production over the same period grew by about 3.1%.

Tunisia's main oil-producing fields are El Borma, Ashtart and Sidi el Kilani, and gas is produced from El Borma and the offshore Miskar field. An oil refinery is located at Bizerte and there is a growing chemicals industry. In January 2004, the government announced that it planned to invest TD882 million (US\$687 million) in the country's oil industry, an increase of almost TD130 million compared with 2003.

Non-fuel minerals contribute some 3-4% of the country's GDP, the most important product being phosphate rock, which also underpins the chemicals industry and provides substantial export revenues from fertilisers. Mining of iron ore supports a small but important iron and steel industry, and the country also produces zinc and lead.

Phosphate production is controlled and operated by the parastatal Compagnie des Phosphates de Gafsa, which has nine operating open-pit and underground operations in the Gafsa region. The phosphate beds are exposed on the flanks of elongated dome-like anticlinal structures that extend eastwards for more than 130 km from the Algerian border near Tamerza. Individual beds can commonly be traced for tens of kilometres along one or both flanks of these structures. Mining is by open-pit and underground methods, two of the more recently-developed mines being Kefeddour and Moulares. The country produces about 8 Mt/y of phosphate and is second only to Morocco in Africa in terms of its phosphate production. Reserves are estimated at 3,500 - 4,000 Mt of phosphate.

The single most important metalliferous mine is Bougrine, which exploits carbonate-hosted zinc-lead mineralisation. The underground mine, located 160 km south-west of Tunis, was re-opened by Toronto-based Breakwater Resources Ltd in 1998 after being closed down by Metall Mining in 1996 in response to low metal prices. In 2003, the mine produced 77.1 Mlb of zinc (74.3 Mlb in 2002) and 9.9 Mlb of lead (10.1 Mlb) in concentrates from

410,961 t of ore milled (423,414 t). Minesite operating costs per tonne of ore milled were US\$35.81 (US\$32.19) and total cash costs were US\$0.35/lb of payable zinc (US\$0.36/lb). Since acquiring the mine in 1997, Breakwater has focused on improving the metallurgical performance of the operation and reducing cash operating costs. Advances have been made in increasing the grade of the zinc concentrate, which is now at 54.6%.

Head grades are 10.9% Zn and 1.6% Pb, and concentrates are transported by rail to Tunis and then shipped to smelters throughout the Mediterranean region. Proven and probable reserves at the end of 2002 were 1.19 Mt averaging 11.6% Zn and 2.0% Pb, with a further resource of 1.3 Mt at slightly higher grades.

Bougrine is expected to cease operations in the first half of 2005. As a consequence, the company has begun to consider alternative uses for the mill and infrastructure. A study was initiated towards the end of 2003 to determine the technical merit of converting the plant to a clinker-grinding and last-stage cement-producing plant.

During 2000, Breakwater also commenced a diamond-drilling programme on the nearby Kebbouch-Sud property about 12 km from Bougrine, following up a hole previously drilled by the Tunisian Government that intercepted 10.1% Pb over 14.4 m. Early results released by Breakwater included 2.5% Zn and 0.5% Cu over 12.7 m, 8.7% Zn and 0.8% Cu over 2.6 m, and 5.0% Zn and 0.7% Cu over 31.0 m. However no further results have been declared publicly since that time.

A Canadian company, Consolidated Global Minerals Ltd (CGM), had options on the Djebba, Fej Lahdoum and Bon Jabeur zinc-lead projects but these do not appear to have been taken up. The Djebba property extends over 16 km<sup>2</sup> in the Beja district (Atlas Mountains) of northwestern Tunisia, about 110 km from Tunis. A previous resource estimate for the carbonate-hosted zinc-lead mineralisation at Djebba demonstrated about 2.66 Mt at a grade of 6.14% Zn and 3.34% Pb. Zinc mineralisation has been reported over a strike length of at least 2 km.

Fej Lahdoum consists of four adjacent and contiguous blocks totalling 197 km<sup>2</sup>: Jebel Fej Lahdoum, Kef Dougga, Kef El Adhama and Ain Jem-mala. The Jebel Fej Lahdoum permit area encloses the currently active Fej Lahdoum lead-zinc mine, owned and operated by an agency of the Tunisian Government. The blocks straddle a 30 km-long geological structure that contains nine large geochemical anomalies, and two known orebodies. The Dar N'Hal Nord orebody is open along strike and to depth, with the current resource totalling 2.0 Mt at a grade of 5% Pb and 8% Zn. The Dar N'Hal Sud orebody is likewise open along strike and to depth, with current reserves of 500,000 t at 13% Pb and Zn (combined). CGM reported nine major surface geochemical anomalies that range in size from 0.5 km<sup>2</sup> to 3.5 km<sup>2</sup>.

CGM also has an option on a permit area adjacent to, and incorporating, the Bou Jabeur permit, 16 km<sup>2</sup> in size and covering the eastward extensions of

the geological structures that host the Bou Jabeur orebodies. Bou Jabeur, a 1,000 t/d mine and mill, operated at 150 t/d in 2002, and has reserves estimated at 4.2 Mt at 1.3% Pb, 3.9% Zn, 30.09% BaSO<sub>4</sub>, and 8.18% CaF<sub>2</sub>.

# ECL MINERALS

Global Exploration Expertise

**Target generation**

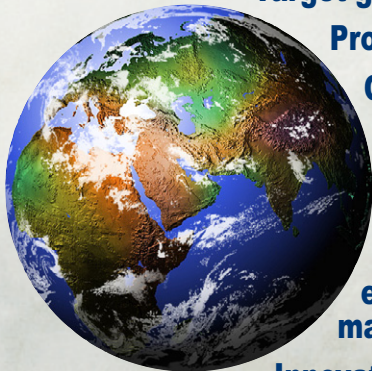
**Project sourcing**

**Country & project  
risk analysis**

**Feasibility & due  
diligence**

**Complete  
exploration  
management**

**Innovative science &  
technology for exploration**



**metals • industrial minerals • diamonds**

**EXPLORATION CONSULTANTS LTD.**

Highlands Farm, Greys Road, Henley-on-Thames, Oxon. RG9 4PR, UK  
Tel: +44 (0)1491 415400, Fax: +44 (0)1491 415415, email: r.foster@ecqc.com

**EXPLORATION CONSULTANTS, AUSTRALIA PTY. LTD.**

Level 1, 610 Murray Street, West Perth, Western Australia, 6005  
Tel: +61 (0)8 9322 4333, Fax: +61 (0)8 9322 7254, email: office.oz@ecqc.com

**EXPLORATION CONSULTANTS LTD. INC.**

9801 Westheimer, Suite 1060, Houston, Texas 77042, USA  
Tel: +1 713 784 5800, Fax: +1 713 974 3687, email: office.usa@ecqc.com

Website at [www.ecqc.com](http://www.ecqc.com)

